

REMARKS

The present paper is responsive to the latest non-final Office Action. The response is accompanied by a petition for a one (1) month extension of time, tolling the response deadline to October 17, 2008.

The Examiner now rejects claims 1, 3, 5, 7, 10-12, 14, 16, 18, 21, and 23 as allegedly anticipated under 35 U.S.C. §102(e) by U.S. Patent No. 6,762,515 to Gummin. Briefly, (see especially Figures 2 and 5), Gummin teaches multiple linear SMA actuators disposed in serial or in parallel. Respectfully, the Examiner has simply ignored the limitations of the present independent claims to make this rejection.

Turning as an example to the present claim 1, that claim clearly recites as follows:

1. A linear actuator, comprising:

*a housing;*

*a stop displaceable on a linear axis with respect to the housing;*

*at least one wire formed of a shape-memory alloy, said wire attached at a first end to the stop and at a second end to the housing for applying a pulling force to the stop when heated to a predetermined temperature to cause the stop to slide in a first direction into a housing interior channel;*

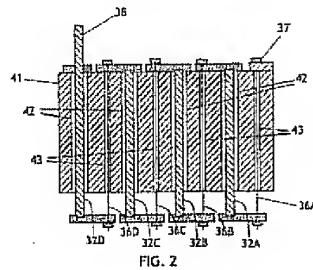
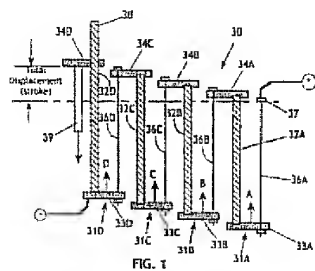
*a spring applying a biasing force to the stop in a second direction counter to the first direction; and*

*a wire heater.*

Those limitations are included also in independent claims 12 and 21. Thus, the present independent claims recite at least a stop which displaces on a linear axis with respect to a housing, and an SMA wire attached at a first end to that stop and at a second end to that housing.

With respect to the cited Gummin patent, as shown in Figures 1 and 2 (reproduced below for convenience), the Gummin SMA wire (reference numerals 36A-D) are attached at first ends to brackets 33A-D and at second ends to brackets 34A-D. The Examiner is also

directed to the Gummin specification, at *Col. 5, ll 4-17*: “[E]ach sub-module 31 includes a longitudinally extending rod 32, and end brackets 33 and 34 secured to the lower end and upper end of the rod 32... SMA wire 36A extends from the lower bracket 33a to an anchor point 37SMA wires 36B extends from the lower bracket 33B of sub-module 31B to the upper bracket 34A of sub-module 31A, and SMA wires 36A-36D join sub-modules B to C, and C to D...”).



Gummin goes on to specifically identify an optional housing (*Col. 5, ll 64-66*: “[W]ith regard to Figure 2, the invention may provide a block-like housing 41 ...”). That housing is expressly recited, and shown in the Figures, as distinct from brackets 33, 34. Nowhere does Gummin recite or even hint at attaching an end of an SMA wire to a housing. Only the embodiment with the SMA wire attached to end brackets 33, 34 is contemplated. As set forth in the present independent claims, and also as shown at least in Figures 2a-2b of the present application, the recited SMA wire of the present invention is attached at a first end to a stop, and at a second end to a housing. Thus, this claim limitation is missing in Gummin, and the Section 102 rejection is fatally flawed.

Even more, if the Examiner wishes to yet again alter his position and argue that end brackets 33, 34 of Gummin are a “housing,” the present claim limitation of “a stop displaceable with respect to a housing” obviates the validity of that interpretation as a basis for rejecting the present claims. With reference to Figures 1 and 2 of Gummin, clearly the

distal end 38 of rods 32 (the feature interpreted as a “stop” in the Examiner’s rejection) moves concurrently with end brackets 33, 34 in the direction of arrows A-D, and therefore “stop” 38 is not displaceable with respect to brackets 33, 34. Thus, if the Examiner attempts to use end brackets 33, 34 as a “housing” to meet the present claim limitations, again the rejection fails.

Still yet further, the present independent claims recite an SMA wire for “... applying a pulling force to the stop when heated to a predetermined temperature to cause the stop to slide in a first direction into a housing interior channel ..” and “... a spring applying a biasing force to the stop in a second direction counter to the first direction...” Gummin teaches and shows in Figure 1 the exact opposite arrangement, that is, a spring 39 which biases rod 32 *into* channel 42, and SMA wires 32A-D which bias rod 32 *out of* channel 42. Thus, yet another of the present claim limitations cannot be met by the art cited by the Examiner.

Finally, Gummin does not teach or fairly suggest the limitation of a plate adapted for concurrently attaching to each actuator stop, which is set out expressly in claim 12. Gummin simply does not and cannot teach each of the present independent claim limitations with the requisite specificity to support a Section 102 rejection.

The Examiner is reminded that to support a rejection of claims as anticipated by a prior art teaching, *all* of the elements of the claim must be set forth in the prior art, expressly or inherently, not just a portion of those limitations.<sup>1</sup> For the reasons set forth above, Gummin does not and cannot set forth each and every claimed limitation as set forth in independent claims 1, 12, and 21, for at least the lack of the limitations of a stop displaceable on a linear axis with respect to a housing, an SMA wire attached at a first end to that stop and at a second end to a housing, and an SMA wire for biasing a stop in to an interior of the housing with a spring for displacing the stop to an exterior of the housing.

---

<sup>1</sup> *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987) (“A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.”); *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989) (“The identical invention must be shown in as complete a detail as is contained in the ... claim”).

Rather, Gummin teaches only an SMA wire 36 which is not attached to a housing 41, but rather which is attached at either end to brackets 33, 34, which are shown in Figures 1 and 2 as being displaceable concurrently with rod 32/rod end 38. Also, Gummin teaches a wire for moving rod 32/rod end 38 in a channel 42 in a first outward direction, and a spring 39 for moving the rod end in the channel in an opposed direction, not the alternative configuration set forth in the present independent claims. Since Gummin lacks at least these limitations, the independent claims of the present application cannot be said to be anticipated by the teachings of the Gummin patent under the “all elements” test of *Verdegaal* and *Richardson*. The claims depending from claims 1, 12, and 21 incorporate all limitations of the claims from which they depend, and are therefore also believed to patentably define over any teaching of Gummin. Reconsideration of the anticipation rejection of the claims is believed to be merited and is respectfully requested.

Next, the Examiner rejects claims 1-31 under 35 U.S.C. §103(a) over new art, U.S. 5,749,533 to Daniels, in view of U.S. 6,762,515 to Gummin. For purposes of the 103 rejection, the Examiner cites Gummin (see page 4 of the Action) only for a teaching of “... SMA actuator comprising wire guide for SMA wires 42-43 or 101-104, and many SMA actuators with SMA wires 36, 61. Claim 1 of the present application does not contain the wire guide limitation, nor does it recite multiple SMA actuators. Therefore, it is presumed that as to the Section 103 rejection, only Daniels is applied against claim 1.

Daniels teaches an electronic braking mechanism for a fishing reel. The portion of Daniels relied on by the Examiner is depicted in Figures 19a-e, and described at *Col. 22, line 15 - Col. 23, line 40*. In brief, the depicted embodiment of the Daniels invention uses SMA wires to bias a drag brake for a fishing reel. With particular reference to Figures 19(a) and 19(b), Daniels teaches a fishing reel having a frame 216 (not numbered in these figures), with frame 216 having a through-hole 246 through which a cylindrical friction element 244 passes. Clamps 250 hold both ends of SMA wires 242, which are passed over a heat sink

head 248. A spring 256 prevents contact of friction element 244 and spool 30 when SMA wires 242 are not contracted. Upon application of an electrical current, SMA wires 242 contract, biasing friction element 244 into contact with spool 30 [see Figure 19 (b)] to provide a braking action.

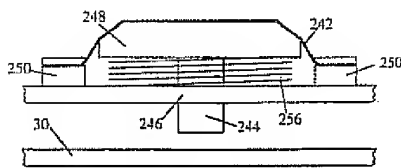


Figure 19(a)

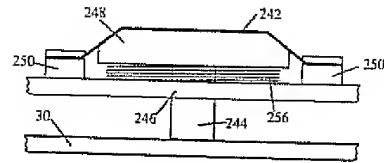


Figure 19(b)

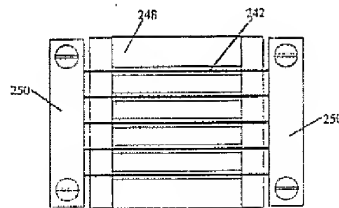


Figure 19(c)

Once again the Examiner has simply ignored claim limitations in making the Section 103 rejection. Specifically, as noted above, the independent claims of the present application recite SMA wires attached at a first end to a stop and at a second end to a housing. Even interpreting Daniels' friction element 244 as a stop, clearly SMA wires 242 are not attached at one end to that friction element 244 and at the other end to a housing. In fact, the SMA wire 242 is not attached to friction element 244 at all. Rather, as is clearly shown in Figures 19a-e of Daniels, and as described at *Col. 22, ll 15-30*, SMA wires 242 are attached at opposed ends to clamps 250 (shown in exploded view in Figure 19e), and lie on a top surface

of heat sink head 248 (see Figure 19c).

The Daniels patent does recite a “housing,” that is, cover 44, see Figure 1b and *Col. 7, line 25*, but provides no hint of securing an SMA wire thereto. If the Examiner wishes to attempt to characterize one or more of heat sink head 248 or clamps 250 as a “housing” to support the Section 103 rejection, he should do so. However, in order to support that interpretation of the features of Daniels, it would be necessary to identify something actually housed by one or more of those structures, which in view of the structure and function expressly recited for heat sink head 248/clamps 250 is at best unlikely.

If, in the alternative, the Examiner attempts to utilize Daniels’ frame 216 (un-numbered in Figures 19a-e, but being described in the specification as the feature through which through-hole 246 passes) as the “housing” limitation, the rejection still fails. Under this interpretation, SMA wire 242 of Daniels is not attached at a first end to a stop (interpreted as friction element 244 in Daniels) and at a second end to a housing. As noted above, SMA wires 242 are not attached to friction element 244 at all. Rather, SMA wires 242 of Daniels are secured at both ends to clamps 250 and/or frame 216, and a middle portion of SMA wires 242 rests on heat sink head 248. Again, each and every limitation of the present claims is not met, expressly or inherently.

Still further, if in yet another alternative interpretation the Examiner chooses to utilize spool 30 of Daniels to meet the limitation of a “housing,” that interpretation again fails to meet all the limitations of the present claims. As noted above, the present claims require a stop displaceable on a linear axis with respect to a housing, wherein the stop may be caused to slide in a first direction into a housing interior channel. Even under the strained interpretation of the surface of the Daniels spool 30 as a “housing” (presumably to “house” fishing line), no interior channel is present in that “housing” into which friction element 244 may slide. Each and every limitation of the present claims is not met, expressly or inherently, by the primary 103 reference. As discussed above, the secondary 103 reference, Gummin, along with its other failings as a Section 102/103 reference, similarly fails to teach or suggest

the limitation of an SMA wire attached at a first end to a stop and at a second end to a housing. Thus, neither the primary reference, the secondary reference, nor any reasonable combination of the two teaches or suggest, expressly or inherently, each and every limitation of the claims under examination.

When determining whether a claim is obvious in view of one or more prior art references, an examiner must make “a searching comparison of the claimed invention - *including all its limitations* - with the teaching of the prior art.”<sup>2</sup> Thus, “obviousness requires a suggestion of all limitations in a claim.”<sup>3</sup> The failure of an asserted combination to teach or suggest each and every feature of a claim remains fatal to a rejection under Section 103, despite any recent revision to the Manual of Patent Examining Procedure. Therefore, as set forth in the foregoing discussion, the *prima facie* case of obviousness is simply not properly supported for at least the lack of the feature of an SMA wire attached at one end to a housing. The Gummin teaching relied on by the Examiner, that is, multiple SMA actuators in series or in parallel, does not cure this fatal flaw in the rejection. Gummin also fails to teach or suggest, expressly or inherently, the presently claimed features of a stop displaceable on a linear axis with respect to a housing, and an SMA wire for biasing a stop into an interior of the housing with a spring for displacing the stop to an exterior of the housing.

Summarizing, this latest combination of art cited by the Examiner (Daniels plus Gummin) neither teaches nor fairly suggests each and every limitation of the presently claimed subject matter, and the *prima facie* obviousness case has not been supported. Independent claims 1, 12, and 21 are allowable over any reasonable interpretation of the combination of Daniels and Gummin. The claims depending therefrom are also in condition

---

<sup>2</sup> *Ex parte Wada and Murphy*, Appeal 2007-3733 (B.P.A.I. Jan. 14, 2008), citing *In re Ochiai*, 71 F.3d 1565, 1572 (Fed. Cir. 1995); see also Manual of Patent Examining Procedure §2143.03, requiring the consideration of every claim feature in an obviousness determination.

<sup>3</sup> *Ex parte Wada and Murphy*, Appeal 2007-3733 (B.P.A.I. Jan. 14, 2008), citing *CFMT, Inc. v. Yieldup Intern. Corp.*, 349 F.3d 1333, 1342 (Fed. Cir. 2003) (citing *In re Royka*, 490 F.2d 981, 985 (CCPA 1974).

for allowance without consideration of obviousness.<sup>4</sup> The Section 103 rejection should be withdrawn.

For the foregoing reasons, the pending claims of the present application are in condition for allowance. Therefore, the prompt issuance of a Notice of Allowance is respectfully requested. *The Commissioner is authorized to deduct the fee for the concurrently presented petition for extension of time from Deposit Account No. 11-0978, and to credit any overpayments to that Account.* If any other issues remain, the Examiner is invited to call the undersigned representative to expedite prosecution of this application.

Respectfully submitted,

**KING & SCHICKLI, PLLC**



Patrick M. Torre  
Reg. No. 55,684

247 North Broadway  
Lexington, Kentucky 40507  
(859) 252-0889

---

<sup>4</sup> *In re Fine.*